

gale from the 27th to the 29th; wind veered from s. to nw.; lowest barometer, 29.99 (761.7), at 10.30 a. m. of the 28th, in N. 51° 15', W. 21° 0'. Capt. J. J. Small, of the s. s. "Bolivia," reports a whole gale from s. veering to nw., continuing from the 27th to 29th; lowest barometer, 29.43 (747.5), at 11 p. m. of the 28th, in N. 55° 20', W. 17° 02'.

## OCEAN ICE.

The only iceberg reported during the month was observed on the 2d, in N. 45° 20', W. 45° 26', from the s. s. "Elstow," the berg being from fifty to sixty feet high.

In November, 1885, the only iceberg reported during the month was observed in N. 48° 00', W. 51° 10'. In November, 1884, several icebergs were seen in N. 45° 56', W. 52° 38', but none were reported in that month of the years 1882 and 1883.

## FOG.

The following shows the limits of fog-areas encountered on the north Atlantic Ocean during November, 1886, as reported by shipmasters:

1st.—The s. s. "Virginian," in N. 43° 26', W. 49° 5' (at noon), encountered a dense fog at 3 a. m., which continued until 6 p. m., with fresh breeze from s. veering to nw. in p. m.

3d.—The s. s. "Ems," had a dense fog from N. 47° 3', W. 43° 16' to N. 46° 38', W. 44° 43', with easterly winds.

4th and 5th.—The s. s. "Tyrian," on the 4th, in N. 42° 10', W. 47° 7' (at noon), had a dense fog setting in at 10 a. m., which continued until 10 a. m. of the 5th, in N. 42° 5', W. 52° 28' (at noon), with variable winds.

6th and 7th.—The s. s. "Palestine," on the 6th, in N. 43° 50', W. 59° 55' (at noon), encountered a dense fog at 9 p. m., which continued until 2 a. m. of the 7th, in N. 42° 51', W. 65° 46' (at noon), with strong breezes veering from se. to s.

7th.—The s. s. "Bulgarian," in N. 48° 10', W. 42° 7' (at noon), had dense fog from 5 to 8 p. m., with moderate, variable breezes.

8th.—The s. s. "Iowa," in N. 44° 18', W. 52° 44' (at noon), entered a dense fog at 2.45 a. m., which continued until 5.45 p. m., with fresh sse. breezes. The s. s. "Bulgarian," in N. 46° 13', W. 47° 32' (at noon), had dense fog from 11 a. m. to 2 p. m., with fresh se. breezes.

15th.—The s. s. "Cephalonia," in N. 46° 47', W. 44° 16' (at noon), at 4.30 p. m. dense fog set in and cleared off at 7.30 p. m., with strong sw. breeze. The s. s. "Bavarian," in N. 43° 40', W. 50° 43' (at noon), had dense fog from 7 a. m. to 11.30 a. m., with wind sw., veering at 10 a. m. to w., in fresh gale. The s. s. "Prussian," in N. 52° 16', W. 33° 42' (at noon), had dense fog from 4 p. m. to 7 p. m., with moderate sw. winds.

From above reports it will be seen that fog was encountered in the localities given during November, 1886, with moderate winds blowing from the southern quadrants, which would seem to indicate that conditions favorable for the development of fog during this month would exist to the eastward of barometric depressions, with southerly winds and barometric pressure about, or slightly above, the normal.

## WATER-SPOUTS.

The officers of the s. s. "Energia" report having observed a huge water-spout about half a mile ahead of them while a little below Wolf Trap Light, Chesapeake Bay, about 3 p. m. of the 25th. It came towards them from a northeast direction, and looked very threatening; finally it moved away to the southwest, where they saw it pass over to the land near the Wolf Trap, where it burst and the water went down in torrents.

## SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York City and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to shipmasters.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during November, 1886, five reports con-

cerning storms encountered by vessels in the Atlantic west of the forty-fifth meridian. Four messages were sent from Boston.

## TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for November, 1886, is exhibited on chart ii by the dotted isothermal lines; and in the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. On chart iv the departures from the normal temperature are illustrated by lines connecting stations of normal or equal abnormal values.

In New England, the middle Atlantic states, and North Carolina the mean temperature of the month is slightly above the normal; the departures in New England average 1°.8, and in the middle Atlantic states 1°.6; the largest departures in excess of the normal are at Boston, Massachusetts, excess 3°.2, New London, Connecticut, 3°.2, and Philadelphia, Pennsylvania, 3°.1. With the exception of the small section of country mentioned, the temperature of the air over the United States has been colder than the average November; the departures are quite large in the middle plateau, the middle slope, and in Oregon. At one station, Salt Lake City, Utah, the temperature is 7°.9 below the normal. West of the eighty-fifth meridian nine stations, only, show an increase of temperature, at six of these the increase is less than one degree; the other three are Leavenworth, Kansas, increase 3°.8, Rio Grande City, Texas, 2°.6, and Saint Louis, Missouri, 2°.5.

In the following table are given the mean temperatures for the several geographical districts, with the normals and departures, as deduced from Signal Service observations:

Average temperatures for November.

Districts.	Average for November, Signal-Service observations.		Comparison of Nov., 1886, with the average for several years.
	For several years.	For 1886.	
New England.....	40.7	42.5	+ 1.8
Middle Atlantic States.....	45.4	47.0	+ 1.6
South Atlantic States.....	55.0	54.7	- 0.3
Florida Peninsula.....	66.2	64.0	- 2.2
Eastern Gulf States.....	55.5	54.5	- 1.0
Western Gulf States.....	56.4	55.7	- 0.7
Rio Grande Valley.....	65.2	66.4	+ 1.2
Tennessee.....	48.2	47.6	- 0.6
Ohio Valley.....	43.2	41.8	- 1.4
Lower Lake region.....	38.8	37.8	- 1.0
Upper Lake region.....	34.2	33.1	- 1.1
Extreme Northwest.....	25.2	23.7	- 1.5
Upper Mississippi Valley.....	38.5	37.7	- 0.8
Missouri Valley.....	34.7	34.0	- 0.7
Northern slope.....	31.9	29.2	- 2.7
Middle slope.....	36.5	35.7	- 0.8
Southern slope.....	49.2	48.8	- 0.4
Southern plateau.....	47.4	44.4	- 3.0
Middle plateau.....	37.7	30.9	- 6.8
Northern plateau.....	37.8	32.9	- 4.9
North Pacific coast region.....	45.8	42.5	- 3.3
Middle Pacific coast region.....	53.3	52.3	- 1.0
South Pacific coast region.....	59.2	56.8	- 2.4

The following are some of the most marked departures from the normal temperature at Signal Service stations:

Above normal.		Below normal.	
Leavenworth, Kansas.....	3.8	Salt Lake City, Utah.....	7.9
Boston, Massachusetts.....	3.2	Las Animas, Colorado.....	5.9
New London, Connecticut.....	3.2	Winnemucca, Nevada.....	5.7
Philadelphia, Pennsylvania.....	3.1	Boise City, Idaho.....	5.4
Rio Grande City, Texas.....	2.6	Prescott, Arizona.....	5.4
Saint Louis, Missouri.....	2.5	Fort Maginnis, Montana.....	4.9
New York City.....	2.5	Denver, Colorado.....	4.7
Washington City.....	2.0	Pike's Peak, Colorado.....	3.9

## RANGES OF TEMPERATURE.

The monthly, and the greatest and least daily, ranges of temperature, are given in the table of miscellaneous meteorological data.

The following are some of the greatest and least monthly ranges at Signal Service stations:

Greatest.		Least.	
	°	°	
Fort Assinaboine, Montana.....	88.0	Tatoosh Island, Washington Ter.....	21.5
Moorhead, Minnesota.....	80.1	Fort Canby, Washington Ter.....	21.7
Poplar River, Montana.....	78.1	Astoria, Oregon.....	24.0
Fort Maginnis, Montana.....	77.0	Key West, Florida.....	25.7
Saint Paul, Minnesota.....	76.9	Pysht, Washington Ter.....	26.5
Fort Totten, Dakota.....	76.0	Port Angeles, Washington Ter.....	28.5

#### DEVIATIONS FROM NORMAL TEMPERATURES.

In the table below are given, for certain stations, as reported by voluntary observers, the normal temperatures for November for a series of years, the mean temperature for November, 1886, and the departures from the normal:

Station.	County.	Normal temperature for November.	Number of years.	Mean temperature for Nov., 1886.	Departure.
<i>Arkansas.</i>		0		0	0
Lead Hill.....	Boone.....	48.1	5	45.2	- 2.9
<i>California.</i>					
Sacramento.....	Sacramento.....	51.2	21	46.0	- 5.2
<i>Connecticut.</i>					
Middletown.....	Middlesex.....	39.3	28	39.9	+ 0.6
New Haven.....	New Haven.....	40.4	100	42.7	+ 2.3
Thompson.....	Windham.....	38.6	30	39.8	+ 1.2
<i>Dakota.</i>					
Webster.....	Day.....	33.1	4	23.0	-10.1
<i>Florida.</i>					
Archer.....	Alachua.....	61.6	4	60.7	- 0.9
<i>Illinois.</i>					
Anna.....	Union.....	45.5	11	44.2	- 1.3
Mattoon.....	Coles.....	40.2	6	40.5	+ 0.3
Peoria.....	Peoria.....	39.4	30	39.6	+ 0.2
Riley.....	McHenry.....	35.3	26	31.3	- 4.0
Randwick.....	De Kalb.....	36.0	35	34.6	- 1.4
Sycamore.....	De Kalb.....	35.8	6	32.1	- 3.7
<i>Indiana.</i>					
Lafayette.....	Tippecanoe.....	35.1	7	37.3	+ 2.2
Logansport.....	Cass.....	39.9	31	38.9	- 1.0
Spiceland.....	Henry.....	38.6	33	38.0	- 0.6
Vevay.....	Switzerland.....	43.7	21	42.7	- 1.0
<i>Iowa.</i>					
Cresco.....	Howard.....	28.7	10	26.8	- 1.9
Monticello.....	Jones.....	33.4	33	31.7	- 1.7
<i>Kansas.</i>					
Independence.....	Montgomery.....	43.9	15	43.9	0.0
Wellington.....	Sumner.....	41.1	8	43.2	+ 2.1
Yates Centre.....	Woodson.....	39.4	6	38.8	- 0.6
<i>Maine.</i>					
Belfast.....	Waldo.....	35.9	27	38.3	+ 2.4
Bridgeton.....	Cumberland.....	34.5	12	34.6	+ 0.1
Cornish.....	York.....	33.7	29	35.2	+ 1.5
Gardiner.....	Kennebec.....	35.7	50	37.7	+ 2.0
Orono.....	Penobscot.....	33.4	18	37.0	+ 3.6
<i>Maryland.</i>					
Fallston.....	Harford.....	42.3	16	43.1	+ 0.8
<i>Massachusetts.</i>					
Amherst.....	Hampshire.....	38.1	49	40.2	+ 2.1
Cambridge.....	Middlesex.....	39.1	64	41.6	+ 2.5
Fitchburg.....	Worcester.....	36.5	30	37.5	+ 1.0
Somerset.....	Bristol.....	39.5	16	43.6	+ 4.1
Springfield.....	Hampden.....	38.4	19	41.0	+ 2.6
Taunton.....	Bristol.....	41.3	16	42.0	+ 0.7
<i>Nevada.</i>					
Carson City.....	Ormsby.....	35.5	7	32.7	- 2.8
<i>New Brunswick.</i>					
Saint John.....	Saint John.....	35.4	26	38.4	+ 3.0
<i>New Hampshire.</i>					
Concord.....	Merrimack.....	37.4	19	39.2	+ 1.8
Hanover.....	Grafton.....	33.5	26	34.3	+ 0.8
<i>New York.</i>					
North Volney.....	Oswego.....	35.6	19	36.8	+ 1.2
Palermo.....	Oswego.....	34.1	33	34.8	+ 0.7
<i>Ohio.</i>					
Wauseon.....	Fulton.....	35.5	16	34.9	- 0.6
Westerville.....	Franklin.....	38.4	12	38.2	- 0.2
<i>Pennsylvania.</i>					
Dyberry.....	Wayne.....	34.6	19	36.6	+ 2.0
<i>South Carolina.</i>					
Stateburg.....	Sumter.....	53.7	6	53.7	0.0
<i>Texas.</i>					
New Ulm.....	Austin.....	59.1	15	58.7	- 0.4
<i>Vermont.</i>					
Lunenburg.....	Essex.....	31.3	38	33.6	+ 2.3
Newport.....	Orleans.....	33.3	11	33.5	+ 0.2
Strafford.....	Orange.....	33.9	12	37.9	+ 4.0
<i>Virginia.</i>					
Bird's Nest.....	Northampton.....	49.4	18	53.3	+ 3.9
Dale Enterprise.....	Rockingham.....	47.5	6	44.4	- 3.1
Variety Mills.....	Nelson.....	44.2	9	42.5	- 1.7
<i>West Virginia.</i>					
Helvetia.....	Randolph.....	40.6	10	39.5	- 1.1

\*From the "Bulletin of the New England Meteorological Society."

The following notes, in connection with this subject, are furnished by voluntary observers:

*Illinois.*—Riley, McHenry county: the mean temperature of the autumn of 1886, 47° 9, is 1° 0 higher than the mean of the past twenty-five autumns; the autumns of 1862, 1865, 1867, 1870, 1877, 1878, 1879, 1881, 1882, and 1884 were warmer than that of 1886.

*Indiana.*—Vevay, Switzerland county: the highest temperature that has occurred in any November during the past twenty-one years was 78° 0, in 1865; the lowest, -2° 0, in 1880.

Spiceland, Henry county: the highest temperature that has occurred in any November during the past thirty-three years was 74° 0, in 1859; the lowest, -14° 0, in 1880.

*Iowa.*—Monticello, Jones county: during the past thirty-three years the highest November temperature, 70° 0, occurred in 1854, 1859, and 1879; the lowest, -11° 0, in 1863 and 1871.

*Kansas.*—Yates Centre, Woodson county: the mean temperature of the autumn of 1886, 56° 2, is 2° 1 above the mean of the past six years; the warmest autumn during that time occurred in 1884, mean temperature, 58° 9.

Wellington, Sumner county: the highest November mean temperature during the past eight years, 45° 5, occurred in 1879; the lowest mean, 29° 0, in 1880; during that time the highest November temperature, 78° 0, occurred in 1882 and 1885; the lowest, -10° 0, in 1880.

*Maryland.*—Fallston, Harford county: during the past sixteen years the warmest November occurred in 1870, mean temperature, 46° 7; the coldest occurred in 1873, mean, 37° 5.

*Maine.*—Cornish, York county: during the past twenty-nine years the warmest November occurred in 1860, mean temperature, 37° 7; the coldest in 1873, mean, 25° 7.

*Massachusetts.*—Worcester, Worcester county: the mean temperature of the coldest November for nearly half a century was 30° 4, in 1873, and the warmest, 46° 9, in 1849.

*New York.*—Palermo, Oswego county: the mean temperature of the coldest November during the past thirty-three years was 26° 8, in 1873, and the warmest, 41° 9, in 1859. The mean temperature of the autumn of 1886, 43° 0, is 3° 6 below the autumn average of the past thirty-three years. The warmest autumn during that period occurred in 1855, mean temperature, 51° 1; the coldest occurred in 1875, mean, 42° 9.

North Volney, Oswego county: during the past nineteen years the warmest November occurred in 1885, mean temperature, 39° 2; the coldest in 1873, mean, 29° 5. The mean temperature of the autumn of 1886, 48° 2, is 0° 2 below the average of the past nineteen years. The coldest autumn in that time occurred in 1875, mean temperature, 44° 0; the warmest occurred in 1881, mean, 52° 5.

*Ohio.*—Wauseon, Fulton county: temperature comparisons of November during the past sixteen years: highest mean, 40° 3, in 1883; lowest mean, 27° 9, in 1880; maximum, 74° 6, in 1876 and 1882; minimum, -8° 5, in 1880. The mean temperature of the autumn of 1886, 50° 0, is 0° 1 above the average.

*Texas.*—New Ulm, Austin county: temperature comparisons for November during the past fifteen years: highest mean, 65° 6, in 1879; lowest mean, 49° 6, in 1880; maximum, 94° 0, in 1882; minimum, 16° 0, in 1872. The mean temperature of the autumn of 1886, 68° 5, is 0° 4 below the average.

*Virginia.*—Dale Enterprise, Rockingham county: during the past six years the warmest November occurred in 1883, mean temperature, 62° 3; the coldest in 1880, mean, 41° 3.

Variety Mills, Nelson county: during the past nine years the highest mean temperature for November, 47° 5, occurred in 1881; the lowest, 39° 5, in 1880. The mean temperature of the autumn of 1886, 54° 3, is 2° 0 below the average of the past nine autumns.

#### FROSTS.

Frost occurred in the various districts during the month, as follows:

*New England.*—2d, 5th to 10th, 12th, 14th to 30th.

*Middle Atlantic states.*—1st, 2d, 4th to 30th.

*South Atlantic states.*—1st, 2d, 3d, 5th to 10th, 13th, 14th, 16th to 20th, 25th to 29th.

*Florida.*—Archer, 1st, 2d, 8th, 9th, 14th, 19th, 20th, 26th to 29th; Manatee, 30th.

*East Gulf states.*—1st, 7th, 8th, 14th, 18th, 19th, 20th, 25th to 29th.

*West Gulf states.*—4th, 6th, 7th, 8th, 12th to 15th, 17th, 18th, 19th, 24th to 28th.

*Rio Grande Valley.*—Rio Grande City, Texas, 18th.

*Tennessee.*—1st to 9th, 12th to 20th, 23d to 29th.

*Ohio Valley.*—1st to 9th, 12th to 16th, 18th to 22d, 24th to 30th.

*Lower lake region.*—1st, 4th to 30th.

*Upper lake region.*—1st to 30th.

*Extreme northwest.*—1st to 30th.

*Upper Mississippi valley.*—1st, 3d to 8th, 10th to 21st, 23d to 30th.

*Missouri Valley.*—1st to 30th.

*Northern slope.*—1st to 27th, 30th.

Table of comparative maximum and minimum temperatures for November.

State or Territory.	Station.	For 1886.		Since establishment of station.			
		Max.	Min.	Max.	Year.	Min.	Year.
Alabama	Mobile	76.4	30.5	82.0	1879, 1882	27.0	'72, '77, '81
Do	Montgomery	79.0	31.3	83.0	1879, 1882	21.0	1872
Arizona	Prescott	71.0	2.0	75.0	1878, 1885	1.0	1880
Do	Fort Apache	72.0	3.6	77.0	1882	9.0	1880
Arkansas	Fort Smith	75.0	22.1	80.0	1882	1.0	1880
Do	Little Rock	72.7	25.0	83.0	1882	10.0	1880
California	San Francisco	75.0	45.0	78.0	1871	41.0	1880
Do	San Diego	77.0	40.0	82.0	1873	38.0	1881
Colorado	Denver	63.0	6.0	76.0	1876, 1879	18.0	1877
Do	Pike's Peak	23.9	27.0	33.2	1885	38.0	1880
Connecticut	New Haven	70.2	24.0	71.5	1882	4.0	1875
Do	New London	66.3	26.5	72.0	1882	4.0	1875
Dakota	Fort Buford	57.5	10.0	62.0	1879	20.0	1881
Do	Yankton	70.4	0.0	76.0	1876	15.0	1875
Delaware	Del. Breakwater			73.0	1871	23.0	1880
Do	Cape Henlopen	74.0	35.6				
District of Columbia	Washington City	73.1	22.2	80.0	1879	12.5	1880
Florida	Jacksonville	81.9	35.5	84.0	1875, 1877	30.0	1873
Do	Key West	89.8	64.1	91.0	1882	52.0	1873
Georgia	Atlanta	75.2	27.9	80.5	1882	20.0	1883
Do	Savannah	78.0	35.0	82.0	1875	22.0	1872
Idaho	Boise City	58.3	9.4	70.0	1878	7.0	1880
Illinois	Chicago	74.2	24.6	80.5	1882	7.0	1872
Do	Chicago	68.8	16.4	72.0	1874, 1882	7.0	1872
Indiana	Indianapolis	71.6	16.5	75.0	1879	5.0	1880
Indian Territory	Fort Sill	76.9	19.0	84.0	1875	4.0	1880
Iowa	Dubuque	69.5	11.3	69.0	1874, 1879	9.0	1875
Do	Keokuk	69.4	15.2	74.0	1874	7.0	1872
Kansas	Dodge City	73.0	7.3	83.0	1875	0.0	1880
Do	Leavenworth	77.0	15.0	77.0	1874	0.0	1872
Kentucky	Louisville	75.1	21.7	78.0	1879	4.5	1872
Louisiana	New Orleans	82.2	34.4	84.7	1885	31.5	1881
Do	Shreveport	79.4	20.7	86.0	1882	18.0	1880
Maine	Eastport			64.0	1882	13.0	1875
Do	Portland	58.7	21.4	66.0	1882	6.0	1875
Maryland	Baltimore	73.2	26.0	78.0	1879	15.0	1880
Massachusetts	Boston	66.1	24.0	75.0	1876	2.0	1875
Michigan	Detroit	64.9	18.6	69.0	1879, 1882	0.0	1880
Do	Alpena	61.0	11.2	64.2	1885	4.0	1880
Minnesota	Duluth	67.0	4.3	65.0	1874	29.0	1875
Do	Saint Paul	73.6	5.3	72.0	1885	24.5	1875
Mississippi	Vicksburg	81.1	27.8	84.8	1885	23.0	1877, 1880
Missouri	Saint Louis	75.1	23.2	82.0	1879	5.0	1872
Montana	Fort Benton			71.6	1884	31.0	1880
Do	Helena	58.8	8.8	62.0	1884	17.0	1880
Nebraska	North Platte	66.7	5.0	79.0	1876	10.0	1881
Do	Omaha	73.1	9.1	74.0	1874	6.0	1875
Nevada	Winnemucca	58.7	0.6	70.8	1885	9.0	1880
New Hampshire	Mount Washington	45.3	1.8	51.0	1885	40.0	1875
New Jersey	Atlantic City	65.0	24.4	72.0	1881	10.0	1875
Do	Sandy Hook	68.9	29.0	73.0	1881	6.0	1880
New Mexico	Santa Fé	58.8	0.4	77.0	1878	11.0	1880
New York	Buffalo	62.0	22.4	68.3	1881	2.5	1875
Do	New York City	72.7	28.6	74.0	1882	7.0	1875
North Carolina	Charlotte	74.0	27.5	80.0	1879	18.0	1880
Do	Wilmington	77.4	29.7	83.0	1877, 1879	20.0	1872
Ohio	Cincinnati	72.8	18.1	75.8	1882	5.0	1880
Do	Cleveland	71.0	19.6	72.5	1882	0.0	1880
Oregon	Portland	57.8	25.6	68.0	1873	22.5	1880
Do	Roseburg	73.0	22.3	69.7	1884	17.5	1880
Pennsylvania	Pittsburg	68.8	22.0	79.0	1876	4.0	1880
Do	Philadelphia	72.7	26.9	77.0	1881	8.0	1875
Rhode Island	Block Island	63.5	32.5	70.0	1881	19.0	1880
South Carolina	Charleston	78.0	34.9	82.0	1879	28.0	1881
Tennessee	Knoxville	72.5	23.7	80.5	1881	11.5	1872
Do	Nashville	73.6	22.7	80.6	1882	13.0	1872
Texas	Fort Davis	81.0	17.5	81.6	1883	6.0	1880
Do	Galveston	85.1	34.5	82.0	1875, 1878	29.0	1880
Utah	Salt Lake City	60.0	14.4	70.0	1882	3.0	1880
Virginia	Lynchburg	73.3	24.1	80.2	1882	13.0	1880
Do	Norfolk	74.8	29.7	80.0	1879	20.0	1872
Washington Ter.	Spokane Falls	53.8	5.4	60.0	1885	3.0	1881
Do	Olympia	57.5	27.0	63.0	1884	21.0	1882
Wisconsin	La Crosse	67.8	6.7	70.0	1874	21.0	1875
Do	Milwaukee	67.3	11.3	70.0	1874, 1882	14.0	1875
Wyoming	Cheyenne			69.0	1876	20.0	1875

Middle slope.—1st to 30th.

Southern slope.—2d to 6th, 8th, 9th, 11th to 21st, 23d to 29th.

Southern plateau.—1st to 5th, 8th to 11th, 13th to 30th.

Middle plateau.—1st to 30th.

Northern plateau.—1st to 19th, 21st, 22d, 24th to 30th.

North Pacific coast region.—1st to 23d, 25th to 30th.

Middle Pacific coast region.—1st to 7th, 10th, 12th, 13th, 14th, 16th to 19th, 20th to 30th.

South Pacific coast region.—Los Angeles, California, 1st, 2d, 3d, 13th, 16th, 17th, 18th, 19th, 22d, 23d, 24th; Poway, California, 17th to 21st, 23d, 24th, 25th; Cahuenga, California, 17th, 19th, 24th.

## ICE.

Ice formed in the southern parts of the country, as follows:

Alabama.—Mobile, 18th; Montgomery, 26th, 28th.

Arizona.—Yuma, 20th.

California.—Los Angeles, 16th, 17th, 19th.

Florida.—Pensacola, 19th.

Georgia.—Forsyth, 7th, 8th, 9th, 14th, 26th to 29th.

Mississippi.—Vicksburg, 18th.

North Carolina.—Reidsville, 1st, 7th, 8th, 9th; Raleigh, 7th; Charlotte, 19th, 27th; Smithville, 8th, 19th.

New Mexico.—Gallinas Spring, 2d.

South Carolina.—Charleston, 8th, 9th; Spartanburg, 9th, 19th, 20th, 26th to 29th.

Tennessee.—Chattanooga, 7th, 8th, 9th, 14th, 18th, 19th, 26th, 28th; Nashville, 1st, 7th, 8th, 14th, 15th, 16th; Milan, 7th; Ashwood, 1st, 7th, 8th, 13th to 16th, 18th, 19th, 26th, 27th.

Texas.—Abilene and Fort Davis, 13th and 17th; Galveston, 17th; Corsicana, 13th, 16th, 17th, 18th, 20th, 25th, 26th, 27th.

## TEMPERATURE OF WATER.

The following table shows the highest and lowest temperatures of water observed at the several stations; the monthly ranges of water temperature; the average depth at which the observations were made; and the mean temperature of the air:

Temperature of water for November, 1886.

Station.	Temperature at bottom.		Range.	Average depth, feet and tenths.	Mean temperature of the air at station.
	Max.	Min.			
Alpena, Michigan	46.3	30.6	15.7	11.2	32.0
Augusta, Georgia	59.6	49.8	9.8	6.9	51.9
Baltimore, Maryland	59.6	45.0	14.6	12.3	46.4
Block Island, Rhode Island	56.4	45.5	10.9	8.1	46.6
Boston, Massachusetts	52.2	42.1	10.1	22.6	47.8
Buffalo, New York	53.0	33.7	19.3	14.3	37.3
Canby Fort, Washington Territory	49.3	46.0	3.3	14.8	45.6
Cedar Keys, Florida	73.1	55.1	17.0	7.7	60.0
Charleston, South Carolina	66.9	56.7	10.2	37.3	57.1
Chincoteague, Virginia	69.4	46.2	23.2	3.1	50.0
Chicago, Illinois	48.4	32.5	15.9	8.1	38.2
Cleveland, Ohio	55.0	37.7	17.3	13.2	38.9
Detroit, Michigan	49.9	33.9	16.0	26.9	38.5
Duluth, Minnesota	45.1	35.7	9.4	10.7	27.8
Escanaba, Michigan	49.7	30.2	13.5	18.8	30.1
Galveston, Texas	70.4	51.2	19.2	14.4	62.0
Grand Haven, Michigan	49.6	32.2	17.4	18.2	35.4
Jacksonville, Florida	70.9	58.5	12.4	18.0	59.1
Key West, Florida	79.2	72.2	7.0	18.8	73.2
Mackinaw City, Michigan	52.1	34.0	18.1	9.8	34.6
Macon, Fort, North Carolina	65.7	52.6	13.1	14.7	55.2
Marquette, Michigan	49.4	35.9	13.5	11.0	30.4
Mobile, Alabama	68.5	56.5	12.0	16.6	56.1
New London, Connecticut	57.6	47.0	10.6	11.5	44.4
New York City	56.6	46.8	9.8	15.4	45.3
Norfolk, Virginia	60.3	49.3	11.0	15.9	51.2
Pensacola, Florida	76.0	55.1	20.9	17.3	58.4
Portland, Maine	49.1	41.9	7.2	16.7	38.7
Portland, Oregon	49.6	40.1	9.5	48.8	41.6
Sandusky, Ohio	50.0	34.1	15.9	10.0	38.2
San Francisco, California	56.0	52.1	3.9	38.3	55.1
Savannah, Georgia	68.3	52.6	15.7	10.2	58.0
Toledo, Ohio	50.0	33.9	16.1	12.2	36.6
Wilmington, North Carolina	59.6	51.9	4.7	8.3	55.3

\* Record for 27 days.

† Record for 23 days.

## PRECIPITATION.

[Expressed in inches and hundredths.]

The distribution of rainfall over the United States and Canada for November, 1886, as determined from the reports of about five hundred and eighty stations, is exhibited on chart iii.

The precipitation of the month is above the normal in New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, the Ohio Valley, Tennessee, Arkansas, and the northern portion of the east Gulf States; it is also excessive in Minnesota, Dakota, Montana, and the upper part of the Missouri Valley; in all other districts it is deficient. The departures in excess of the normal are nowhere very large; the greatest occur in Tennessee and the Ohio Valley; one station, Memphis, gives an excess 4.46; the departures in the extreme northwest are small, averaging 0.68. The rainfall of the Pacific coast has been very small, and large deficiencies occur in this region; they are especially large in the southern part of Washington Territory and in northern Oregon. Over the extreme northwestern point of Washington Territory the precipitation is unusually large, 11.80 falling at Neah Bay, and 10.44 at